

CLAIMS

1. A method for assessing the characteristic response of a medium to an excitation transient of predetermined duration which causes the medium to emit a series of signals over a period of time which is long relative to the duration of the excitation transient, wherein the signals are detected, the duration of each interval between successive signals is measured, and a relationship relating the interval between the excitation transient and the emission of each signal to the interval between each signal and the preceding signal in the series is derived to represent the characteristic response.
2. A method according to claim 1, wherein the interval between the excitation transient and the emission of each signal is plotted against the interval between each signal and the preceding signal in the series, a curve is fitted to the plot, the position of a minimum value of the interval between the excitation transient and the emission of each signal as represented by the curve is determined, and the interval between successive signals corresponding to the position of the minimum is determined to provide a measure of the characteristic response of the medium.
3. A method according to claim 1 or 2, wherein the excitation transient is an excitation pulse.
4. A method according to any of claims 1 to 3, wherein the characteristic response of the medium is assessed from a single excitation transient.
5. A method according to any of claims 1 to 3, wherein the characteristic response of the medium is assessed by averaging the characteristic response assessed in relation to a series of excitation transients.
6. A method according to any preceding claim, wherein the signals result from excitation of fluorophores by the excitation.

7. A method according to any of claims 1 to 5, wherein the signals result from energy transfer to one species from the another species excited by the excitation.
8. A method according to any preceding claim, wherein the timing of the signals is determined from a predetermined portion of each signal.
9. A method according to any preceding claim, wherein excitation is delivered to a plurality of samples of the medium from a single source, and signals from each sample are received by a single detector.
10. A method according to claim 9, wherein each of the plurality of samples receives an excitation in turn, and signals from each of the samples are detected in turn.
11. A method according to claim 9, wherein each of the plurality of samples receives an excitation simultaneously, and signals from all of the samples are detected in parallel.
12. A method according to any preceding claim, wherein a property of the excitation is used to normalise the detected signals.
13. A method according to any preceding claim, wherein a property of the excitation is recorded and subsequently deconvoluted from the detected signals.
14. A method according to any preceding claim, wherein a bleaching rate of a fluorophore is measured.
15. An apparatus for carrying out a method in accordance with any preceding claim, comprising means for detecting each of the series of signals, means for measuring the duration of each interval between successive signals in the series, means for plotting the interval between the excitation and the emission of each signal against the interval between each signal and the preceding signal in the series, means

for fitting a curve to the plot, means for determining the position of the minimum value of the interval between the excitation pulse and the emission of each signal as represented by the curve, and means for determining the interval between successive signals corresponding to the position of the minimum to provide a measure of the characteristic response of the medium.

16. A method for assessing the characteristic response of a medium to an excitation of predetermined duration substantially as hereinbefore described with reference to the accompanying drawings.

17. An apparatus for assessing the characteristic response of a medium to an excitation of predetermined duration substantially as hereinbefore described.